from 2.2 g/d to 0.2 g/d in women. Mean energy intake from ITFA was likewise decimated, falling from 1.1%E to 0.1%E in both men and women. Eleven hundred and ninety-three fewer CHD deaths (BEST UI 1,149 – 1,688), were potentially attributable to the ITFA reduction, representing some 11% of the overall 11,100 CHD mortality fall in Denmark between 1991 and 2007. The greatest attributable mortality falls were seen in the most deprived quintiles (reflecting their bigger reductions in ITFA consumption). Adding ITFA data to the original IMPACTsec model improved the overall model fit from 64% to 73%. The major contributions to the fall in CHD mortality remained consistent across a wide range of sensitivity analyses.

Conclusion Denmark's mandatory elimination of ITFA was very effective. Furthermore, it may well have accounted for approximately 11% of the substantial reduction in CHD deaths achieved between 1991 and 2007. The most deprived groups benefited the most, thus reducing inequalities. Adopting the Danish ITFA regulatory approach elsewhere could substantially reduce CHD mortality while also improving health equity.

OP10 PREVALENCE AND SOCIO-DEMOGRAPHIC ASSOCIATIONS OF DIET AND EXERCISE RISK-FACTORS FOR NON-COMMUNICABLE DISEASES IN BO, SIERRA LEONE

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Background Little is known about modifiable dietary and physical activity risk factors for non-communicable diseases (NCDs) in Sierra Leone. This information is critical to the development of health improvement interventions to reduce the prevalence of these diseases.

Methods Adults aged 40+ were recruited from 10 urban and 30 rural sub-districts in Bo. We examined risk factors including: <150 minutes of moderate and vigorous-intensity physical activity (MVPA) weekly, physical inactivity for >3 hours daily, <5 daily portions of fruit and vegetables, and salt consumption (during cooking, at the table, and in salty snacks). We used logistic regression to investigate the relationship between these outcomes and participants' socio-demographic characteristics.

Results 1,966 eligible participants were included in the study. The prevalence of behavioural risk factors was 83.1% for <5 daily portions of fruit and vegetables; 40.8% and 91.9% for adding salt at the table or during cooking, respectively and 30.6% for eating salty snacks; 22.4% for MVPA <150 minutes weekly, and 43.9% for being physically inactive >3 hours daily. Multivariable analysis showed that urban individuals were more likely than rural individuals to consume <5 daily portions of fruit and vegetables (Odds Ratio (OR) 1.06, 95% Confidence Interval (1.00–1.11)), add salt at the table (OR 1.86 (1.80–1.92)), eat salty snacks (OR 2.03 (1.97–2.11)) and do MVPA <150 minutes weekly (OR 1.17 (1.13–1.22)). Male individuals were more likely to add salt at the table (OR 1.25 (1.21–1.29) and consume salty snacks (OR 1.36 (1.32–1.41)) than female individuals but were less likely to report the other behavioural risk-factors examined). Increasing age was associated with higher odds of eating <5 daily portions of fruit and vegetables daily; adding salt at the table; eating salty snacks; doing <150 minutes of MVPA per week and physical inactivity >3hours. Generally, people in lower wealth quintiles had higher odds of any of the risk factors than those in the highest wealth quintile.

Conclusion Dietary risk factors for NCDs are highly prevalent, particularly among urban residents in Sierra Leone. Our findings show that forthcoming policies in Sierra Leone need to consider modifiable risk factors for NCDs in the context of urbanisation.

This study used data from Cardiovascular Disease (CVD) Risk Factors in Sierra Leone, which was supported by a Small Grant from the Wellcome Trust, grant number 209921/Z/17/Z.

OP11 IMPLEMENTING A NATIONAL WEIGHT-REDUCTION LIFESTYLE INTERVENTION TO THE NHS HEALTH CHECKS POPULATION: LONG-TERM OUTCOMES MICRO-SIMULATION MODELLING OF THE NHS DIABETES PREVENTION PROGRAMME

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Background Type 2 Diabetes Mellitus (**T2DM**) and obesity are highlighted as the main reasons for the increase in Non-communicable Disease (**NCD**) incidence in the last decades. The NHS Diabetes Prevention Programme (**NHS-DPP**) was rolled-out in 2016, intending to reduce or delay T2DM in the population, offering lifestyle advice to reduce weight and HbA1c levels in the at-risk population. In this study, we model long-term health, equity and cost-effectiveness outcomes of a weight-reduction lifestyle intervention when added as part of the NHS Health Checks (**NHSHCs**) programme.

Methods We used the WorkHORSE tool to model NHSHCs scenarios, powered by the $IMPACT_{NCD}$ stochastic dynamic microsimulation. We used R v4.04. We defined the baseline as the current implementation of the NHSHCs programme. Invite and uptake percentages are based on NHS Digital reports; prescription (pharmacological and smoking cessation) and cost data are based on our work evaluating NHSHCs. We defined three policy scenarios for the weight-reduction lifestyle intervention, modelled using empirical data from the NHS-DPP first two years:1) reported annual capacity, 2.5% mean weight loss as percentage weight in intention-to-treat population, cost per completer £435;2) as Scenario 1) but annual capacity is doubled;3) as Scenario 1) but mean weight loss is 4.0% (observed in completers population). The simulation period was 2020–2039, attrition rate 20% and standard UK Treasury discount rates were applied.

Results Preliminary results suggest that in Scenario 1) approximately 2,000 (95% Uncertainty Interval (UI): -370 to 4300) T2DM cases could be prevented or postponed. However, when assumed capacity doubled or a higher weight effect was used although in a smaller group, Scenarios 2) and 3) prevented or postponed 3,500 (95% UI: 1,300 to 6,200) and 2,000 (95% UI: -650, 4000) T2DM cases respectively. Case years prevented or postponed in each scenario are 16,000

(95% UI:-5000 to 39,000), 32,000 (95% UI: 9,500 to 56,000) and 17,000 (95% UI: -7200 to 37,000) respectively. Compared to the baseline, no scenario was more cost-effective nor reduced health inequalities; in all cases the probability of becoming cost-effective or equitable did not reach 80%.

Conclusion Results suggest the intervention has the potential to reduce T2DM incidence but requires substantial participation and increased long-term effectiveness. The effects in other NCDs, cost-effectiveness and health inequalities were uncertain.Whilst reduction in T2DM is encouraging, a combination of high-risk and structural policies is needed to reduce the health inequalities gap and address the NCDs crisis, which is urgently overdue.

OP12 PROJECTING THE BURDEN OF CARDIOVASCULAR DISEASE AND DIABETES IN GERMANY: NATIONAL TRENDS AND REGIONAL INEQUALITIES

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10.1136/jech-2021-SSMabstracts.12

Background Although age-adjusted mortality rates of coronary heart disease (CHD), stroke and type 2 diabetes mellitus (T2DM) are declining in many industrialised countries, the burden of these diseases may increase due to population aging. In Germany 33% of the population is expected to be older than 60 years by 2035 with differences between East and West Germany. Forecasting the burden and regional inequalities of CHD, stroke and T2DM is vital for efficient health policy planning. This study aimed to 1) project mortality of CHD, stroke and T2DM by sex and age for the German population age 30 and older from 2018 to 2035 and 2) analyse regional inequalities in mortality between East and West Germany.

Methods We used population count estimates, cause-specific death counts (based on ICD-10-GM) from 1998 to 2018 and population projections to 2035 provided by the German Federal Statistical Office. Cause-specific mortality rates were forecast until 2035 for each sex, region and 5-year age category using a functional demographic model. The model was calibrated using a root mean squared error approach based on the last five observed years of data and validated graphically. Uncertainty was computed as 95%-confidence intervals (CI). Age-sex-standardised mortality rate ratios (MRRs) between East and West Germany were estimated using direct standardisation with the 2018 German population as the standard population. Projected death counts were calculated by multiplying mortality rates with projected population counts. We used R v4.0.3 with the packages demography v1.22 and forecast v8.13.

Results We found that annual mortality from CHD in Germany is projected to decrease by 36.52% (~23200 deaths, 95%-CI: 14400–30800) for men and 31.70% (~22400 deaths, 95%-CI: 10000–32200) for women by 2035. Mortality from stroke and T2DM is projected to increase by 21.03% (~6200 deaths, 95%-CI: -15000–59300) and 29.68% (~4200 deaths, 95%-CI: -1200–12000) for men and decrease by 40.30% (~16300 deaths, 95%-CI: 11600–20200) and 14.03% (~2300 deaths, 95%-CI: -3700–6500) for women, respectively. Age-sex-standardised MRRs show that mortality from these causes is higher in East Germany. By 2035, inequalities are projected to narrow for CHD and T2DM, the latter potentially being reversed, and remain constant for stroke. The model performed well in validation analyses.

Conclusion Our projections suggest considerable future decreases in CHD mortality for both men and women in Germany. Deaths from stroke and T2DM are projected to increase for men, while decreasing among women. Inequalities between East and West Germany are expected to decline but largely persist throughout the projection period.

Wednesday 15 September

Children, 13.00 – 15.25

OP13 EARLY CHILD DEVELOPMENT AT 2–5 YEARS PREDICTS COGNITIVE OUTCOMES AT 6–9 YEARS IN LAO PDR: A CASE FOR POPULATION MONITORING USING THE EARLY HUMAN CAPABILITY INDEX IN LOW AND MIDDLE INCOME COUNTRIES

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Background Beyond effects of linear growth on cognitive development, research has seldom focused on children's developmental trajectories in low and middle income countries. This is limited by a lack of suitable measurement tools. Global commitment to tracking early child development, as outlined by the Sustainable Development Agenda, has spurred efforts to address this challenge. The early Human Capability Index (eHCI) has been shown to be a feasible and valid population monitoring measure across diverse contexts. This study investigated the comparative ability of the eHCI and direct assessment of children's development at 2–5 years in predicting cognitive outcomes at 6–9 years.

Methods We used data collected as part of the Early Childhood Education Project, financed by the World Bank Group, in Lao PDR. Baseline data collected commenced in 2015. The sample was drawn from 376 villages in Northern Laos selected on the basis of poverty level. In each villages, 20 random households with at least one child aged between 2–5 years were selected. In 2020, children within the age range of 6–9 were surveyed again. The study population included all children for whom data were collected at both time points (n=5,269). Four measures of children's development were used in this study; eHCI overall development, and direct assessment literacy, numeracy, and executive function. The eHCI, collected via caregiver report, includes 56 items designed to measure early child development across 8 domains. Children's literacy, numeracy, and executive function were measured via 92 direct assessment items. Receiver Operating Characteristic (ROC) curves, C-statistics and 95% confidence intervals were estimated to determine the ability of scores at time 1 to predict poor scores at time 2.